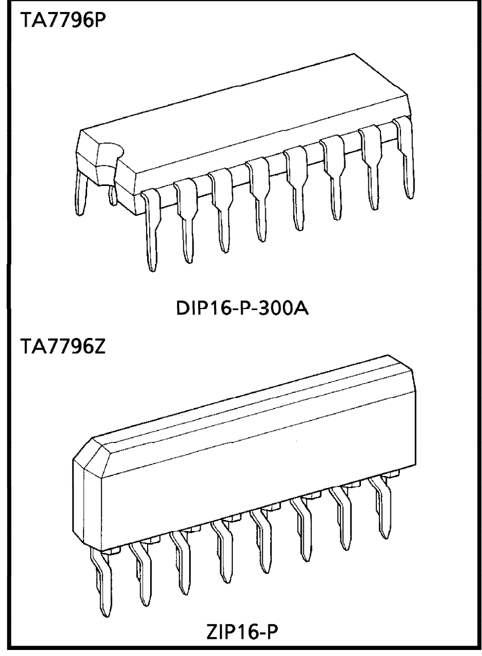
TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT

TA7796P, TA7796Z

SILICON MONOLITHIC

5 BAND GRAPHIC EQUALIZER

TA7796P, TA7796Z are 5-Band graphic equalizer IC, which have 5 resonance circuit and an output buffer amplifier. 5 band graphic equalizer for one channel can be formed easily by externally connecting capacitors and variable resistors which fix fo (resonance frequency).
Dual inline package 16pin TA7796P
Zig-Zag inline package 16pin TA7796Z



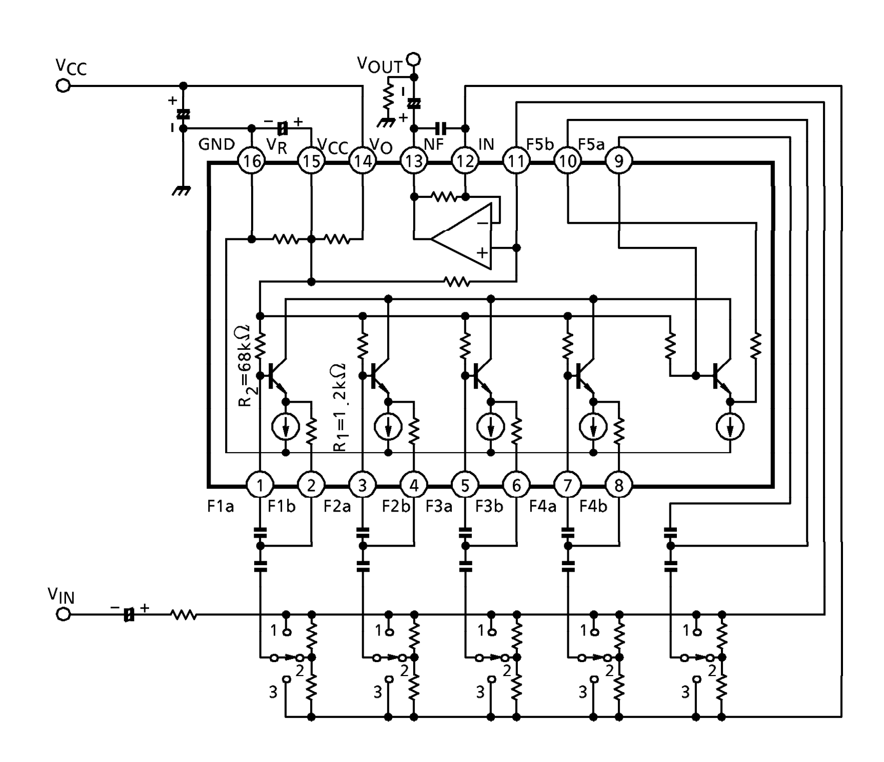
Weight DIP16-P-300A : 1.0g (Typ.)
ZIP16-P : 0.99g (Typ.)

FEATURES

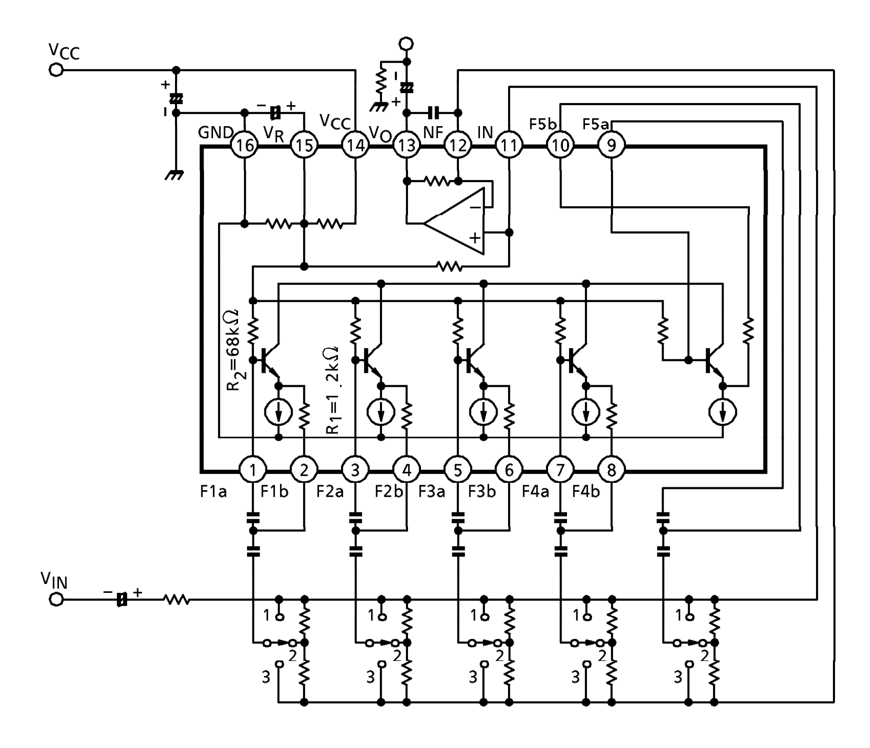
- Few External Parts
- Low Distortion
  : THD = 0.007% (Typ.)
  (V_O = 0.245Vrms (− 10dBm), f = 1.1kHz BW = 20~20kHz, FLAT)
- Low Noise
  : $V_{no} = 3.0\mu V_{rms}$ (Typ.)
  ($R_g = 620\Omega$, V_{in} = 0, BW = 20~20kHz, FLAT)
- Wide Operating Supply Voltage Range
  : V_{CC} = 4.0~16V (Ta = 25°C)

BLOCK DIAGRAM

TA7796P



TA7796Z



MAXIMUM RATINGS ($Ta = 25°C$)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	16	V
Power Dissipation	P_D (Note)	750	mW
Operating Temperature	T_{opr}	−30~75	°C
Storage Temperature	T_{stg}	−55~150	°C

(Note) Derated above Ta = 25°C in the proportion of 6mW / °C for TA7796P, TA7796Z.

ELECTRICAL CHARACTERISTICS (Unless otherwise specified, $V_{CC} = 8V$, $f = 1.1kHz$, $R_L = 10\Omega$, $Ta = 25°C$)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Quiescent Current	I_{CCQ}	—	$V_{in} = 0$	3.5	6.1	9.3	mA
Voltage Gain	G_V (FLT)	—	$V_{out} = 0.775V_{rms}$ (0dBm)	−2.5	−0.5	1.5	dB
	G_V (BST)	—	$V_{out} = 0.775V_{rms}$ (0dBm), f = 110Hz	10.0	11.5	14.0	
		—	$V_{out} = 0.775V_{rms}$ (0dBm), f = 340Hz	10.0	11.5	14.0	
		—	$V_{out} = 0.775V_{rms}$ (0dBm), f = 1.1kHz	10.0	11.5	14.0	
		—	$V_{out} = 0.775V_{rms}$ (0dBm), f = 3.4kHz	10.0	11.5	14.0	
		—	$V_{out} = 0.775V_{rms}$ (0dBm), f = 11kHz	10.0	11.5	14.0	
	G_V (CUT)	—	$V_{out} = 0.775V_{rms}$ (0dBm), f = 110Hz	−14.0	−11.5	−10.0	
		—	$V_{out} = 0.775V_{rms}$ (0dBm), f = 340Hz	−14.0	−11.5	−10.0	
		—	$V_{out} = 0.775V_{rms}$ (0dBm), f = 1.1kHz	−14.0	−11.5	−10.0	
		—	$V_{Out} = 0.775V_{rms}$ (0dBm), f = 3.4kHz	−14.0	−11.5	−10.0	
		—	$V_{out} = 0.775V_{rms}$ (0dBm), f = 11kHz	−14.0	−11.5	−10.0	
Total Harmonic Distortion	THD (FLT)	—	$V_{out} = 0.245V_{rms}$ (−10dBm)	—	0.007	0.10	%
Output Noise Voltage	V_{no} (FLT)	—	$R_g = 620\Omega$, $V_{in} = 0$, BW = 20~20kHz	—	3.0	8.0	μV_{rms}

TYP. DC VOLTAGE OF EACH TERMINAL

TA7796P ($V_{CC} = 8V$, $Ta = 25°C$)

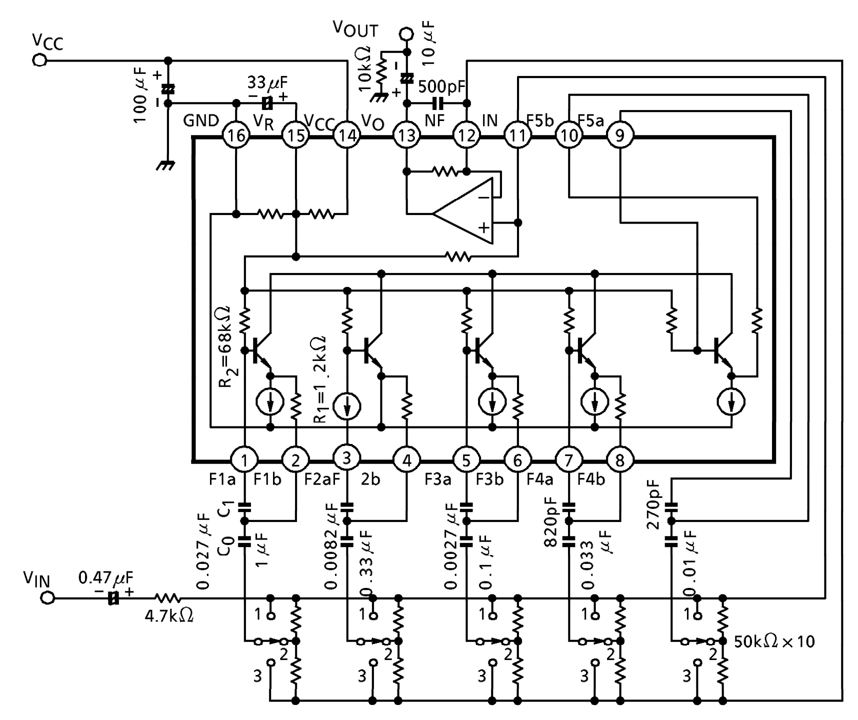
TERMINAL No.	1	2	3	4	5	6	7	8
DC-VOLTAGE (V)	4.70	3.35	4.70	3.35	4.70	3.35	4.70	3.35
TERMINAL No.	9	10	11	12	13	14	15	16
DC-VOLTAGE (V)	4.70	3.35	4.00	4.00	4.00	8.00	4.70	0

TA7796Z ($V_{CC} = 8V$, $Ta = 25°C$)

TERMINAL No.	1	2	3	4	5	6	7	8
DC-VOLTAGE (V)	4.70	3.35	4.00	4.00	4.00	8.00	4.70	0
TERMINAL No.	9	10	11	12	13	14	15	16
DC-VOLTAGE (V)	4.70	3.35	4.70	3.35	4.70	3.35	4.70	3.35

TEST CIRCUIT

TA7796P



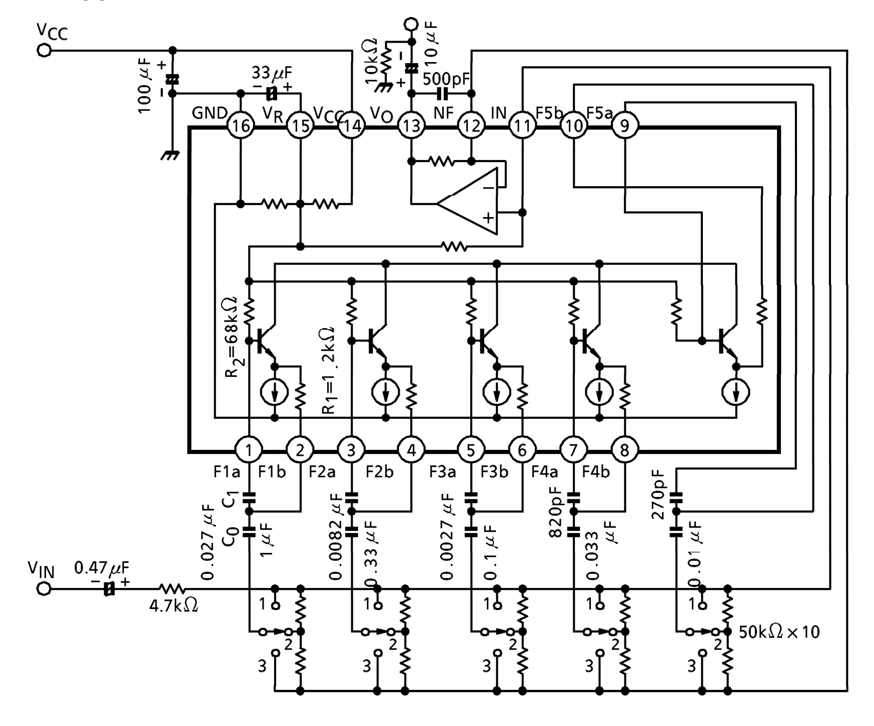
- 1 : CUT 2 : FLAT 3 : BOOST
- f_O (Resonance Frequency)

$$f_O = \frac{1}{2\pi\sqrt{C_0 \cdot C_1 \cdot R_1 \cdot R_2}}$$

$\left(\begin{array}{l} R_1 = 1.2k\Omega,\ R_2 = 68k\Omega, \\ \text{on chip resistor} \end{array} \right)$

C_0 (F)	C_1 (F)	f_O (Hz)
1μ	0.027μ	107
0.33μ	0.0082μ	340
0.1μ	0.0027μ	1.07k
0.033μ	820p	3.40k
0.01μ	270p	10.7k

TA7796Z

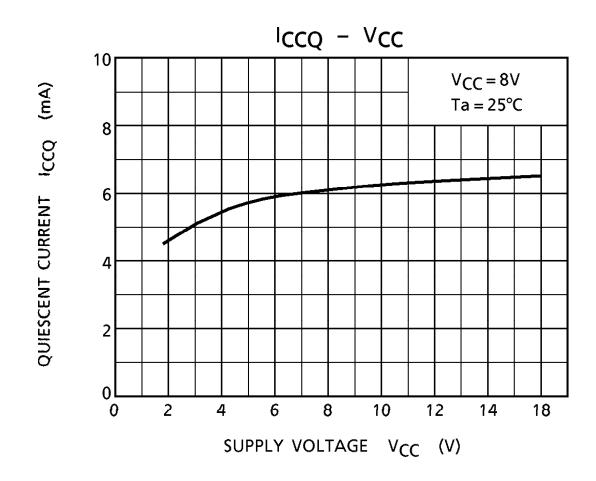


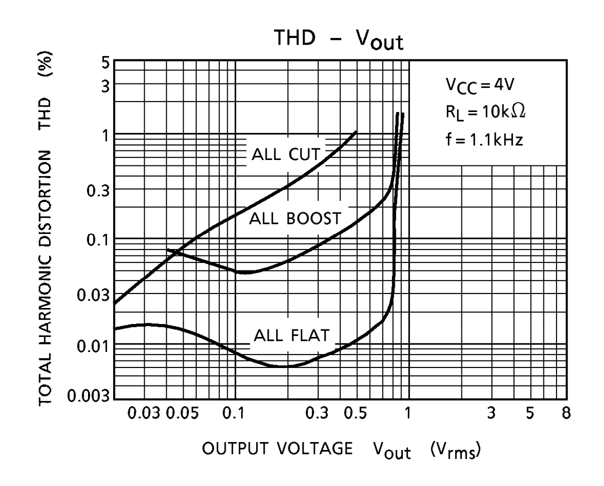
- 1 : CUT 2 : FLAT 3 : BOOST
- f_O (Resonance Frequency)

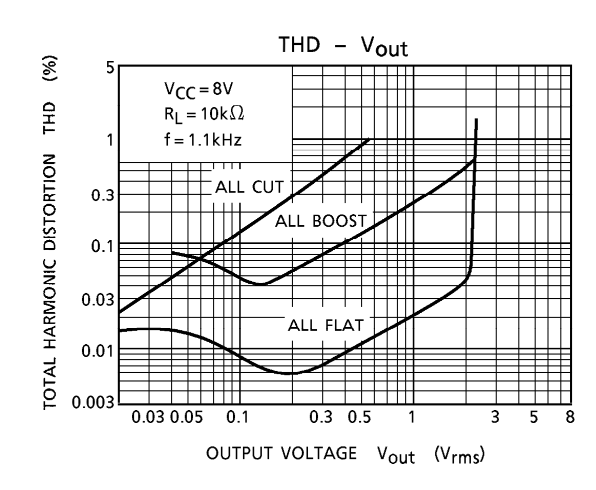
$$f_O = \frac{1}{2\pi\sqrt{C_0 \cdot C_1 \cdot R_1 \cdot R_2}}$$

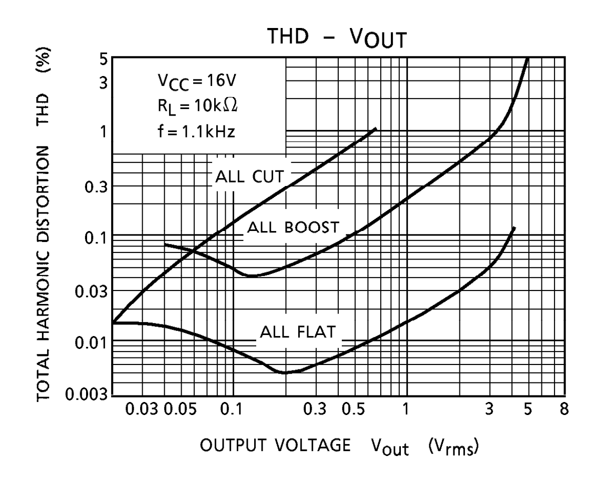
$\left(\begin{array}{l} R_1 = 1.2k\Omega,\ R_2 = 68k\Omega, \\ \text{on chip resistor} \end{array} \right)$

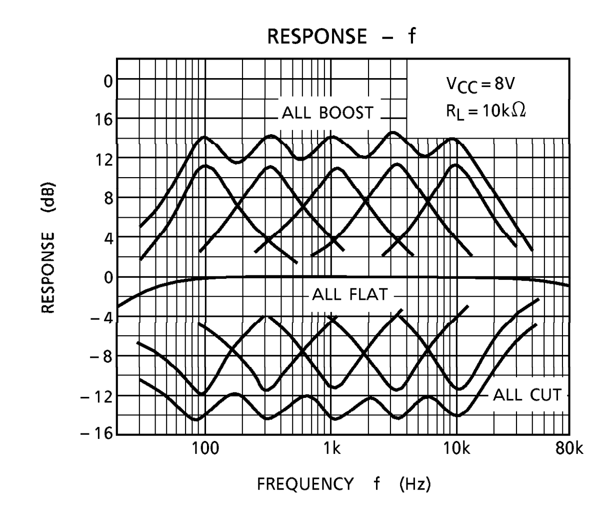
C_0 (F)	C_1 (F)	f_O (Hz)
1μ	0.027μ	107
0.33μ	0.0082μ	340
0.1μ	0.0027μ	1.07k
0.033μ	820p	3.40k
0.01μ	270p	10.7k

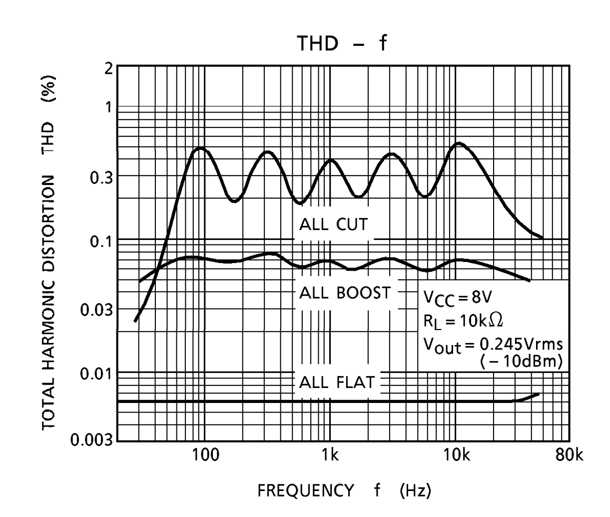

ICCQ – VCC
VCC = 8V
Ta = 25°C
QUIESCENT CURRENT ICCQ (mA)
SUPPLY VOLTAGE VCC (V)


THD – Vout
VCC = 4V
RL = 10kΩ
f = 1.1kHz
ALL CUT
ALL BOOST
ALL FLAT
TOTAL HARMONIC DISTORTION THD (%)
OUTPUT VOLTAGE Vout (Vrms)


THD – Vout
VCC = 8V
RL = 10kΩ
f = 1.1kHz
ALL CUT
ALL BOOST
ALL FLAT
TOTAL HARMONIC DISTORTION THD (%)
OUTPUT VOLTAGE Vout (Vrms)

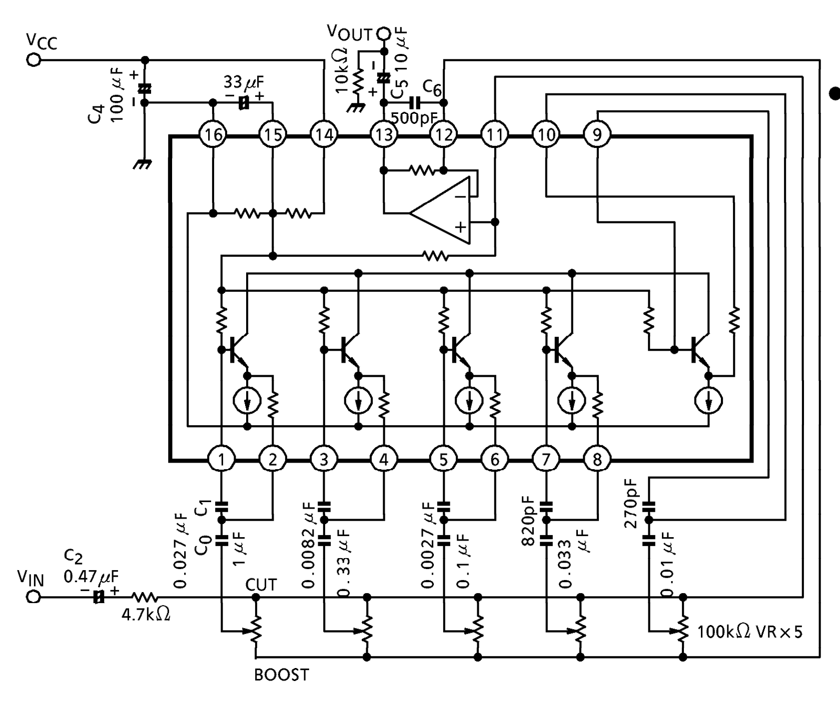

THD – VOUT
VCC = 16V
RL = 10kΩ
f = 1.1kHz
ALL CUT
ALL BOOST
ALL FLAT
TOTAL HARMONIC DISTORTION THD (%)
OUTPUT VOLTAGE Vout (Vrms)


RESPONSE – f
VCC = 8V
RL = 10kΩ
ALL BOOST
ALL FLAT
ALL CUT
RESPONSE (dB)
FREQUENCY f (Hz)


THD – f
ALL CUT
ALL BOOST
ALL FLAT
VCC = 8V
RL = 10kΩ
Vout = 0.245Vrms
(–10dBm)
TOTAL HARMONIC DISTORTION THD (%)
FREQUENCY f (Hz)

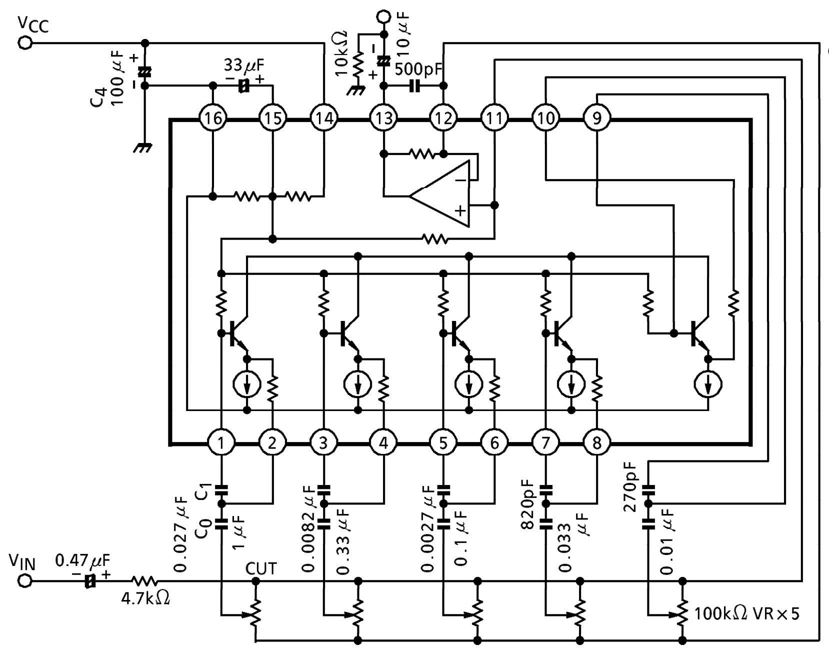
APPLICATION

TA7796P



- Description of external parts.
  - C_0, C_1 : Capacitors used to fix f_o (resonance frequency).
  - C_2 : Input capacitor.
  - C_3 : Decoupling capacitor.
  - C_4 : Power capacitor.
  - C_5 : Output capacitor.

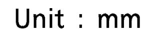
TA7796Z



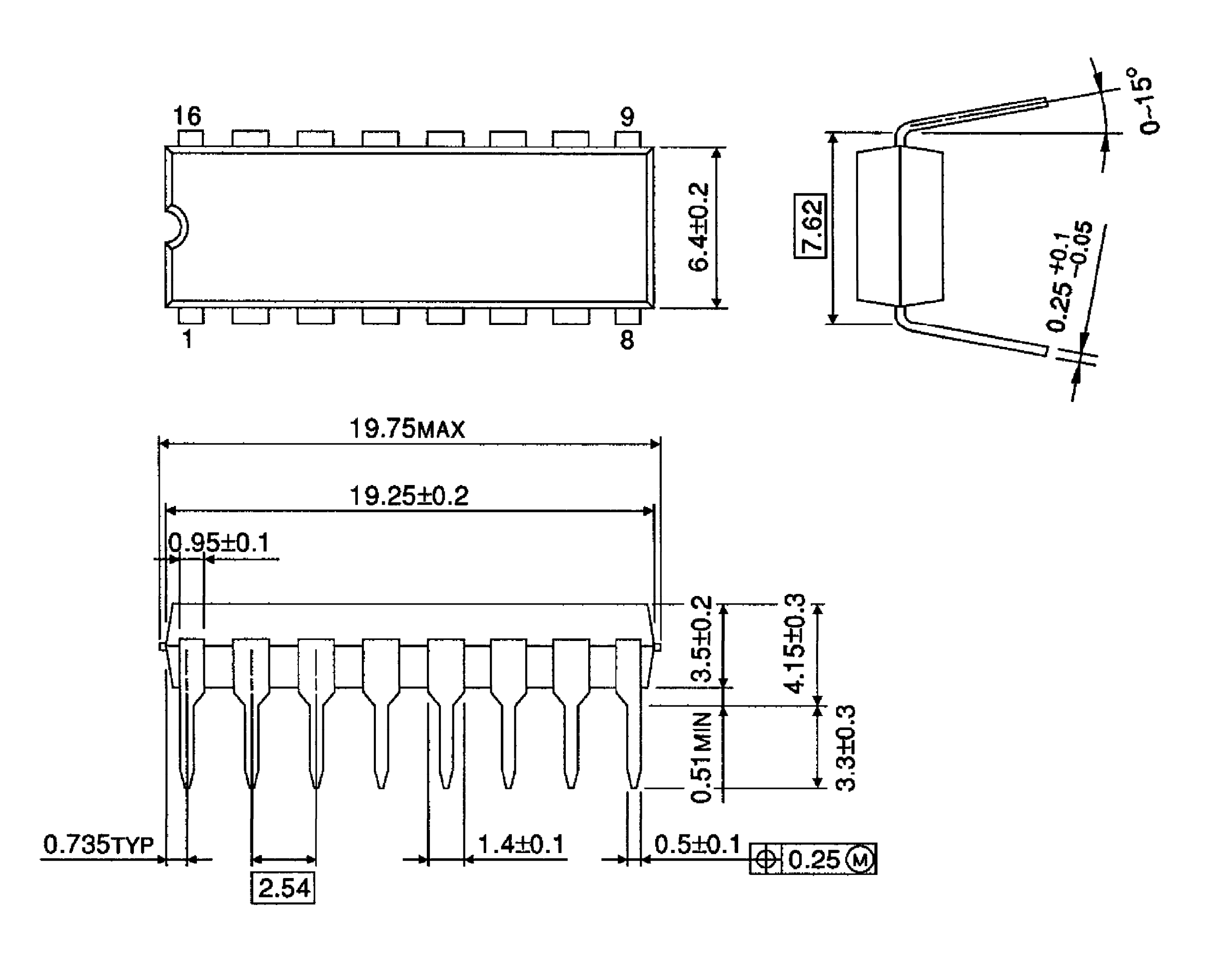
- Description of external parts.
  - C_0, C_1 : Capacitors used to fix f_o (resonance frequency).
  - C_2 : Input capacitor.
  - C_3 : Decoupling capacitor.
  - C_4 : Power capacitor.
  - C_5 : Output capacitor.



OUTLINE DRAWING
DIP16-P-300A



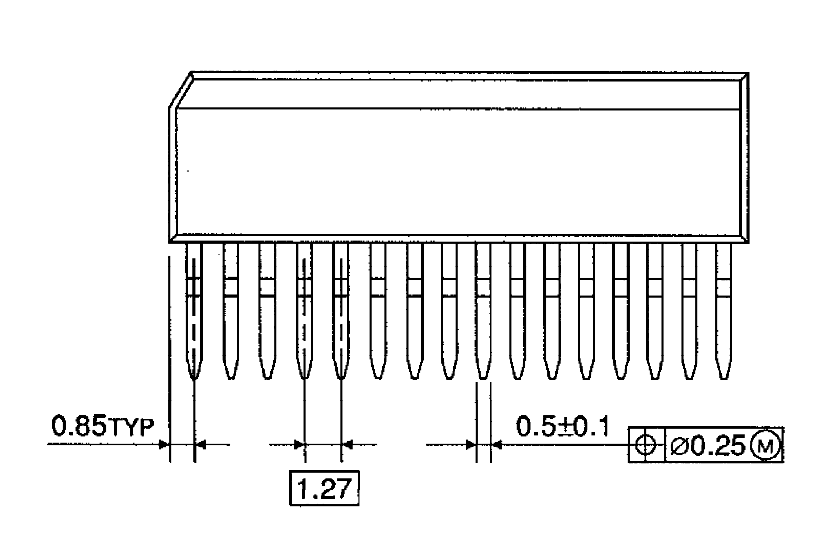
Unit : mm

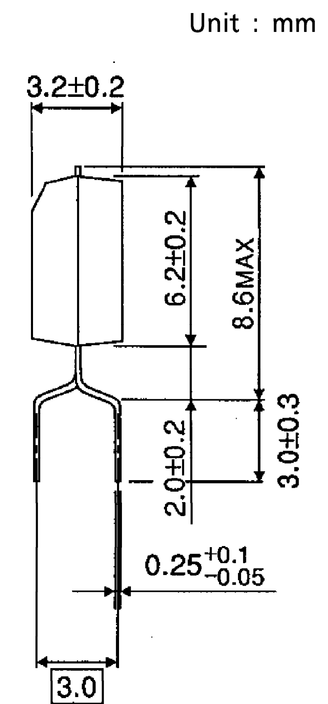


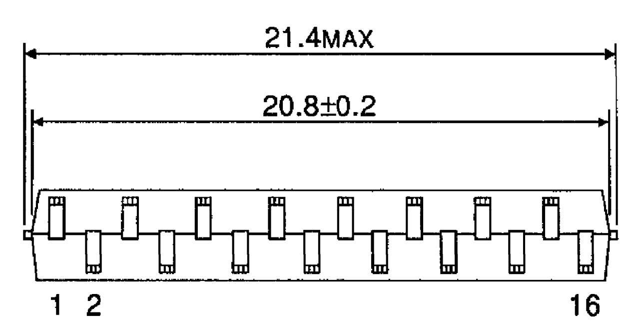
Weight : 1.0g (Typ.)

OUTLINE DRAWING
ZIP16-P

Unit : mm







Weight : 0.99g (Typ.)